WHAT IS CLAIMED:

1. A semiconductor device, comprising:

a semiconductor die having a first surface and a second surface; the first surface having at least one standoff disposed thereon, the standoff having a height.

2. The semiconductor device of Claim 1, wherein the height of the standoff(s) is sufficient to restrict vertical movement of the die when the die is positioned in a mold cavity during encapsulation.

3. The semiconductor device of Claim 1, wherein when the die is positioned in a mold cavity between two mold plates, the height of the standoff(s) is sufficient to contact an inner surface of the mold plates to maintain the die in a centralized and substantially planar orientation within the mold cavity during an encapsulation process.

4. The semiconductor device of Claim 1, wherein at least one standoff is in a cylindrical, conical, square, rectangular, spherical, hemispherical, or tubular shape.

5. The semiconductor device of Claim 1, wherein at least one standoff comprises a graphic design.

6. The semiconductor device of Claim 5, wherein at least one standoff comprises a numeral, a letter, a logo, or a combination thereof.

7. The semiconductor device of Claim 1, wherein the standoff(s) comprise a flexible material.

8. The semiconductor device of Claim 1, wherein the standoff(s) comprise a thermoplastic or thermoset elastomer.

9. The semiconductor device of Claim 1, wherein the standoff(s) comprise an encapsulating material.

10. The semiconductor device of Claim 1, wherein the standoff(s) comprise a thermoset epoxy resin.

11. The semiconductor device of Claim 10, wherein the standoff(s) comprise a novolac epoxy resin.

12. The semiconductor device of Claim 1, wherein the standoff(s) comprise a material selected from the group consisting of acrylics, polyamides, polyethylene terephthalate, polyethylene, polypropylene, polystyrene, poly(vinyl chloride) resins, polycarbonates, and polyurethanes.

13. The semiconductor device of Claim 1, wherein the standoff(s) comprise a thermally conductive material.

14. The semiconductor device of Claim 13, wherein the conductive material is selected from copper, aluminum, gold, and silver.

15. The semiconductor device of Claim 13, wherein the standoff comprises copper foil.

16. The semiconductor device of Claim 1, wherein the standoff(s) comprise a pre-formed structure adhesively mounted on the surface of the die.

17. The semiconductor device of Claim 16, wherein the standoff(s) are mounted with an adhesive paste.

18. The semiconductor device of Claim 14, wherein the standoff(s) are mounted with a double sided adhesive tape.

19. The semiconductor device of Claim 14, wherein the standoff(s) comprise a decal.

20. The semiconductor device of Claim 1, wherein the standoff(s) comprise a screen printed, stenciled, stamped, masked, or coated material.

21. The semiconductor device of Claim 1, wherein the standoff(s) comprises and electroplated or anodized material.

22. The semiconductor device of Claim 1, wherein a standoff encircle a thermally conductive material disposed on the surface of the die.

23. The semiconductor device of Claim 1, wherein the standoff(s) comprises and dam containing a heat sink disposed on the surface of the die.

24. The semiconductor device of Claim 23, wherein the heat sink comprises copper or aluminum.

25. The semiconductor device of Claim 1, further comprising a heat sink disposed on the surface of the die adjacent the standoff(s).

26. The semiconductor device of Claim 1, further comprising a plurality of conductive balls disposed on the second surface of the semiconductor die.

27. The semiconductor device of Claim 26, wherein the conductive balls are disposed on the second surface of the semiconductor die in a ball grid array.

28. The semiconductor device of Claim 26, wherein the conductive balls comprise solder.

29. The semiconductor device of Claim 26, wherein the conductive balls comprise an electrically conductive polymer.

30. The semiconductor device of Claim 26, wherein the conductive balls comprise a conductive epoxy or conductor-filled epoxy.

31. A semiconductor device, comprising:

a semiconductor die having a first surface and a second surface; the first surface having a plurality of standoffs disposed thereon, each of the standoffs having a height; wherein when the die is positioned in a mold cavity between two mold plates, the height of the standoffs is sufficient to contact an inner surface of the mold plates to maintain the die in a centralized and substantially planar orientation within the mold cavity during an encapsulation process.

32. A semiconductor device, comprising:

a semiconductor die having a first surface and a second surface; the first surface having at least one standoff disposed thereon, the standoff having a height, and a plurality of conductive balls disposed on the second surface of the semiconductor die.

33. A semiconductor device, comprising:

a support substrate having opposing sides, each side having a semiconductor die mounted thereon; each die having a first surface and a second surface, the second surface of the die disposed on the support substrate, and the first surface of the die having at least one standoff disposed thereon, the standoff having a height.

34. The semiconductor device of Claim 33, wherein when the device is positioned in a mold cavity between two mold plates, the height of the standoff(s) is sufficient to contact an inner surface of the mold plates to maintain the support substrate in a centralized and substantially planar orientation within the mold cavity during an encapsulation process.

35. The semiconductor device of Claim 33, wherein the support substrate comprises a flexible material.

36. The semiconductor device of Claim 35, wherein the support substrate comprises a polyimide tape.

37. The semiconductor device of Claim 33, wherein the support substrate comprises a material selected from the group consisting of bismaleimide triazine (BT) resin, FR-4 laminate, FR-5 laminate, ceramic, metal clad fiber board, and metal leadframe.

38. The semiconductor device of Claim 33, wherein the second surfaces of each of the dies comprise a plurality of conductive balls disposed thereon and mounted onto the support substrate.

39. The semiconductor device of Claim 33, wherein the first and second dies are flip-chip mounted to the support substrate.

40. The semiconductor device of Claim 33, wherein the first and second dies are adhesively mounted and wire bonded to the support substrate.

41. The semiconductor device of Claim 33, wherein the second surface of each die is mounted on a first surface of a die support substrate with bond pads on the first surface of the die exposed through an opening through the die support substrate and wire bonded to bond pads on the second surface of the die support substrate; and the second surface of the die support substrate comprises a plurality of conductive balls disposed thereon and mounted on the support substrate of the device.

42. The semiconductor device of Claim 33, wherein at least one standoff is in a cylindrical, conical, square, rectangular, hemispherical, spherical, or tubular, shape.

43. The semiconductor device of Claim 33, wherein at least one standoff comprises a graphic design.

44. The semiconductor device of Claim 33, wherein the standoff(s) comprise a preformed structure adhesively mounted on the surface of the die.

45. The semiconductor device of Claim 33, being at least partially encapsulated.

46. A semiconductor device, comprising:

a support substrate comprising a flexible tape having opposing sides, and a semiconductor die mounted on each side of the support substrate; each die having a first surface with at least one standoff disposed thereon, the standoff having a height, and a second surface having a plurality of conductive balls disposed thereon and mounted on the support substrate.

47. A semiconductor device, comprising:

a semiconductor die having at least one standoff disposed thereon, the standoff comprising a thermally conductive heat sink material.

48. The semiconductor device of Claim 47, wherein the heat sink material comprises copper or aluminum.

49. A semiconductor device, comprising:

a semiconductor die having at least one standoff disposed thereon, the standoff encompassing a heat sink material disposed on the die.

50. The semiconductor device of Claim 49, wherein the standoff comprises a plastic material, and the heat sink material comprises a metal material.

51. The semiconductor device of Claim 50, wherein the heat sink material comprises copper or aluminum.

52. A semiconductor device, comprising:

a semiconductor die having at least one standoff disposed thereon, and a heat sink material disposed on the die adjacent the standoff.

53. A semiconductor device, comprising:

a support substrate having a first side and a second side; and a semiconductor die having a first surface with at least one standoff disposed thereon, the standoff having a height, and a second surface disposed on the first side of the support substrate; the second side of the support substrate having at least one standoff disposed thereon, the standoff having a height;

wherein when the device is positioned in a mold cavity between two mold plates, the height of the standoffs is sufficient to contact an inner surface of the mold plates to maintain the support substrate in a centralized and substantially planar orientation within the mold cavity during an encapsulation process.

54. The semiconductor device of Claim 53, wherein the support substrate comprises a polyimide tape.

55. A semiconductor device, comprising:

a semiconductor die having a first surface and a second surface, the first surface of the die having at least one standoff disposed thereon, and the second surface of the die disposed on a first side of a support substrate, and at least one standoff disposed on a second side of the support substrate;

wherein when the device is positioned in a mold cavity between two mold plates, the standoffs each have a height sufficient to contact an inner surface of the mold plates to maintain the support substrate in a centralized and substantially planar orientation within the mold cavity during an encapsulation process.

56. A semiconductor die package, comprising an encapsulated semiconductor device, the semiconductor device comprising: a support substrate having opposing sides; and a semiconductor die mounted on each side of the support substrate; each die having a first surface with at least one standoff disposed thereon, the standoff having a height, and a second surface disposed on the support substrate.

57. The semiconductor die package of Claim 56, wherein the second surface of the die comprises a plurality of conductive balls, and the balls are disposed on the surface of the support substrate.

58. The semiconductor die package of Claim 56, wherein an adhesive element is disposed between the second surface of the die and the support substrate.

59. The semiconductor die package of Claim 58, wherein the support substrate comprises a flexible material.

60. A semiconductor die package, comprising an encapsulated semiconductor device, the semiconductor device comprising first and second semiconductor dies mounted on opposing sides of a polyimide tape substrate; each die having a first surface and a second surface, the first surface having at least one standoff disposed thereon, the standoff having a height, and the second surface of the die disposed on the tape substrate.

61. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material, the package having a first surface and a second surface; the semiconductor device comprising first and second semiconductor dies mounted on opposing sides of a support substrate; each die having a first surface and a second surface, the first surface having at least one standoff disposed thereon, the standoff having a height, and the second surface of the die disposed on the support substrate;

wherein the standoff extends from the first surface of the die to about the surface of the package, and the support substrate is centrally disposed between the first and second surfaces of the package.

62. The semiconductor die package of Claim 61, further comprising a plurality of conductive balls disposed on a side of the support substrate extending outside the encapsulating material.

63. The semiconductor die package of Claim 61, wherein the support substrate comprises a polyimide tape.

64. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material, the package having a first surface and a second surface; the semiconductor device comprising first and second semiconductor dies mounted on opposing sides of a polyimide tape substrate; each die having a first surface and a second surface, the first surface having at least one standoff disposed thereon, the standoff having a height, and the second surface of the die disposed on the polyimide tape substrate;

wherein the standoff extends from the first surface of the die to about the surface of the package, and the polyimide tape substrate is centrally disposed between the first and second surfaces of the package.

65. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material, the package having a first surface and a second surface; the semiconductor device comprising: a support substrate having a first side and a second side; and a semiconductor die having a first surface with at least one first standoff disposed thereon, the standoff having a height, and a second surface disposed on the first side of the support substrate, the second side of the support substrate having at least one second standoff disposed thereon;

wherein the first and second standoffs extend, respectively, from the surface of the die and from the surface of the support substrate to about the surfaces of the package, and

the support substrate is centrally disposed between the first and second surfaces of the package.

66. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material, the package having a first surface and a second surface; the semiconductor device comprising first and second semiconductor dies mounted on opposing sides of a support substrate; each die having a first surface and a second surface, the second surface of the die disposed on the support substrate, and at least a portion of the first surface of each die exposed through the surfaces of the package;

wherein the support substrate is centrally disposed between the first and second surfaces of the package.

67. The semiconductor die package of Claim 66, wherein the support substrate comprises a polyimide tape.

68. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material, the package having a first surface and a second surface; the semiconductor device comprising a semiconductor die mounted on a first side of a support substrate, the die having a first surface and a second surface, the first surface having at least one standoff disposed thereon, and the second surface of the die disposed on a first side of a support substrate, and at least one standoff disposed on a second side of the support substrate;

wherein the first and second standoffs extend, respectively, from the surface of the die and from the surface of the support substrate to about the surfaces of the package, and the support substrate is centrally disposed between the first and second surfaces of the package.

69. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material; the semiconductor device comprising: a support substrate having opposing sides; and a semiconductor die mounted on a side of the support substrate; the die

having a first surface with at least one standoff disposed thereon, the standoff comprising a thermally conductive material.

70. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material; the semiconductor device comprising: a support substrate having opposing sides; and a semiconductor die mounted on a side of the support substrate; the die having a first surface with at least one standoff disposed thereon, the standoff encompassing a heat sink disposed on the die.

71. The semiconductor die package of Claim 70, wherein the standoff comprises a plastic material, and the heat sink material comprises a metal material.

72. A semiconductor die package, comprising a semiconductor device disposed within an encapsulating material; the semiconductor device comprising: a support substrate having opposing sides; and a semiconductor die mounted on a side of the support substrate; the die having a first surface with at least one standoff disposed thereon, and a heat sink material disposed on the die adjacent the standoff.

73. A mold tooling for fabricating a semiconductor die package, comprising:

a pair of molding plates and a molding chamber disposed therebetween, each of the molding plates having an inner surface having at least one standoff disposed thereon, the standoff having a height effective to contact a surface of a die positioned within the molding chamber, and restrict vertical movement of the die within the molding chamber during an encapsulation process.

74. The mold tooling of Claim 73, wherein the standoffs are molded or stamped into the inner surface of the mold plates.

75. The mold tooling of Claim 73, wherein the mold plates comprise a thermoformed material with the standoffs formed on the inner surfaces thereof.

76. The mold tooling of Claim 73, wherein the standoffs comprise a pre-formed structure affixed to the inner surface of the mold plates.

77. The mold tooling of Claim 76, wherein the standoffs are affixed to the inner surface of the mold plates with an adhesive.

78. The mold tooling of Claim 76, wherein the standoffs comprise a decal.

79. The mold tooling of Claim 73, wherein the standoffs comprise a screen printed, stenciled, stamped, masked, or coated material.

80. The mold tooling of Claim 73, wherein the standoffs are stamped into the inner surfaces of the mold plates.

81. The mold tooling of Claim 73, wherein the standoffs are stamped into the inner surfaces of the mold plates.

82. The mold tooling of Claim 73, wherein the standoffs comprise a cylindrical, conical, square, rectangular, hemispherical, spherical or tubular shape.

83. The mold tooling of Claim 73, wherein the standoffs comprise a numeral, a letter, a logo, or a combination thereof.

84. The mold tooling of Claim 73, wherein the standoffs comprise a flexible material.

85. A mold tooling for fabricating a semiconductor die package, comprising:

a pair of molding plates defining a molding chamber therebetween, each of the molding plates having an inner surface having at least one standoff disposed thereon, the standoff having a height effective to contact a surface of a die mounted on a support

substrate and positioned within the molding chamber, and restrict vertical movement of the die and support substrate within the molding chamber during an encapsulation process.

86. A mold tooling for fabricating a semiconductor die package, comprising:

a pair of molding plates and a molding chamber disposed therebetween, each of the molding plates having an inner surface having at least one standoff disposed thereon, the standoff having a height effective to contact a surface of a die mounted on a flexible tape substrate and positioned within the molding chamber, and restrict vertical movement of the die and flexible tape substrate within the molding chamber during an encapsulation process.

87. A method of fabricating a semiconductor device, comprising the steps of:

providing a support substrate having a first surface and a second surface, each surface having terminal pads located thereon;

providing a semiconductor die having a first surface with at least one standoff located thereon, and a second surface; and

mounting the second surface of the die on the first surface of the substrate.

88. The method of Claim 87, wherein the die is flip chip mounted on the support substrate.

89. A method of fabricating a semiconductor device, comprising the steps of:

providing a support substrate having a first surface and a second surface;

providing a semiconductor die having a first surface and a second surface;

forming a standoff on the first surface of the die; and

mounting the second surface of the die on the first surface of the substrate.

90. The method of Claim 89, wherein the step of forming the standoff comprises dispensing a material on the surface of the die by a method selected from the group consisting of screen printing, stenciling, coating, masking, stamping, heat stamping, spray coating, and direct spreading.

91. The method of Claim 89, wherein the step of forming the standoff comprises a process selected from the group consisting of electroplating and anodizing.

92. The method of Claim 89, wherein the step of forming the standoff comprises dispensing a flowable material onto the die; and allowing the flowable material to solidify.

93. The method of Claim 92, wherein the flowable material is dispensed using a liquid capillary.

94. The method of Claim 92, wherein the flowable material is a curable thermoset polymeric material.

95. The method of Claim 94, wherein the polymeric material is a novolac epoxy resin.

96. The method of Claim 89, wherein the standoff comprises a prefabricated object, and the step of forming the standoff comprises affixing the object to the surface of the die.

97. The method of Claim 96, wherein the object is affixed using an adhesive material.

98. The method of Claim 97, wherein the adhesive material comprises an adhesive paste.

99. The method of Claim 97, wherein the adhesive material comprises a double-sided adhesive tape.

100. The method of Claim 97, wherein the standoff comprises an adhesive-backed decal.

101. The method of Claim 96, wherein the standoff comprises a thermally conductive material.

102. The method of Claim 101, wherein the conductive material is selected from the group consisting of copper, aluminum, gold and silver.

103. The method of Claim 102, wherein the standoff comprises a copper foil.

104. The method of Claim 89, wherein the standoff comprises a plastic material, and the step of forming the standoff comprises a process selected from the group consisting of injection molding, extrusion, blow molding, compression molding, transfer molding, and thermoforming.

105. The method of Claim 89, wherein the step of forming the standoff comprises an electroplating or anodizing process.

106. The method or Claim 105, wherein the standoff comprises a thermally conductive material.

107. The method or Claim 106, wherein the conductive material is selected from the group consisting of silver, copper, aluminum, gold and nickel.

108. The method of Claim 89, wherein the standoff is in the form of an enclosure, and the method further comprises disposing a heat sink material on the surface of the die within the standoff enclosure.

109. The method of Claim 108, wherein the heat sink material comprises copper or aluminum.

110. The method of Claim 109, comprising adhering a layer of copper foil to the surface of the die to form the heat sink.

111. The method of Claim 89, wherein the die is flip chip mounted on the support substrate.

112. The method of Claim 89, further comprising:

providing a second semiconductor die having a first surface with at least one standoff located thereon, and a second surface; and

mounting the second surface of the die on the second surface of the substrate.

113. A method of fabricating a semiconductor device, comprising the steps of:

providing a support substrate;

providing a pair of semiconductor dies, each having a first surface and a second surface;

forming a standoff on the first surface of each of the dies; and

mounting the dies on opposing sides of the support substrate, the second surface of each of the dies disposed on the substrate.

114. A method of fabricating a semiconductor die package, comprising the steps of:

providing a die/substrate unit comprising a semiconductor die disposed on a support substrate; the die having a first surface with one or more standoffs disposed thereon, the standoffs having a height, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;

positioning the die/substrate unit within the molding chamber of the mold tooling, with the standoffs in contact with the inner surfaces of the mold plates; and

flowing a molding compound into the molding chamber to at least partially encapsulate the die/substrate unit, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

115. A method of fabricating a semiconductor die package, comprising the steps of:

providing a die/substrate unit comprising a semiconductor die disposed on a support substrate; the die having a first surface with one or more standoffs disposed thereon, the standoffs having a height, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;

positioning the die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

116. A method of fabricating a semiconductor die package, comprising the steps of:

providing a die/substrate unit comprising a semiconductor die disposed on a support substrate; the die having a first surface with one or more standoffs disposed thereon, the standoffs having a height, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;

positioning the die/substrate unit within a molding chamber between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the die/substrate unit is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

117. A method of fabricating a semiconductor die package, comprising the steps of:

providing a semiconductor device comprising a pair of semiconductor dies disposed on opposing sides of a support substrate; each die having a first surface with one or more standoffs disposed thereon, and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; the mold plates having an inner surface;

positioning the semiconductor device within a molding chamber disposed between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

118. A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each having a first surface and a second surface; forming a standoff on the first surface of each of the dies; and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber disposed between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

119. A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff disposed on a first surface; and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber disposed between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

120. A method of fabricating a semiconductor die package, comprising the steps of:

providing a semiconductor device comprising a pair of semiconductor dies disposed on opposing sides of a support substrate; each die having a first surface and a second surface disposed on the support substrate;

providing a mold tooling comprising a pair of mold plates defining a molding chamber therebetween; each mold plate having an inner surface with a standoff disposed thereon;

positioning the semiconductor device within the molding chamber between the mold plates such that the standoffs are in contact with the first surfaces of the dies; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.

121. A method of fabricating a semiconductor die package, comprising the steps of:

fabricating a semiconductor device by providing a pair of semiconductor dies, each die having a standoff disposed on a first surface; and mounting the dies on opposing sides of a support substrate, the second surface of each of the dies disposed on the substrate;

positioning the semiconductor device within a molding chamber disposed between a pair of mold plates each having an inner surface, such that the standoffs are in contact with the inner surfaces of the mold plates; and

introducing a molding compound into the molding chamber, wherein the support substrate of the semiconductor device is maintained in a centralized and substantially planar orientation within the molding chamber as the molding compound is flowed thereabout.